

REMARKS

Overview

In the Office Action under reply, claims 1-33 are pending and have been examined. Claims 1-33 have been rejected under 35 U.S.C. §112, second paragraph, as well as under 35 U.S.C. §103(a). These rejections are addressed in part by the amendments made herein, and are otherwise traversed for the reasons set forth below.

Claim Amendments

By the amendments made herein, claim 6, 27 and 28 have been amended to conform to the claims from which they depend. Thus, to conform with claim 4, claim 6 has been amended to recite a method. Similarly, to conform with claim 26, claims 27 and 28 have been amended to recite a compound.

In addition, claim 7 has been amended to remove the term "selected" from the claim.

No new matter has been added by these amendments.

Rejection under 35 U.S.C. §112, second paragraph

Claims 1-33 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants traverse the rejection for at least the following reasons.

By the amendment made herein, all dependent claims are now consistent with the claims from which they depend. Claims 1-18 are directed toward a method, and claims 19-33 are directed toward a compound.

In the Action under reply, the Examiner appears to be objecting to the presence, in the same application, of claims directed to both a compound and a method. Although it might be proper for the Examiner to issue a *Restriction Requirement*, thereby restricting the claims to a single invention, it is highly improper for the Examiner to *reject* the claims on these grounds. See 37 CFR 1.142, *Requirement for restriction*.

Furthermore, the Examiner states that the claims involve "reacting an amine containing compound with crown ether and with an acid, metal or diazo. Or the claim recites, an amine containing group with a crown ether which crown ether also contains an acid, metal or diazo."

Applicants traverse this interpretation of the claim language. Claims 1-18 are directed toward *a method that comprises reacting an amine-containing compound with a second compound*. The second compound comprises *at least one crown ether group*, and further comprises *a moiety selected from acidic groups, transition metal binding groups and diazo groups*. This language is consistent throughout the claims. Furthermore, claims 19-33 are directed toward *a compound that comprises at least one crown ether group*, and further comprises *a moiety selected from acidic groups, transition metal binding groups and diazo groups*. Again, this language is consistent throughout the claims. The "amine containing group," as stated by the Examiner, is not recited anywhere in the claims. Furthermore, the claims do not require "reacting an amine containing compound with crown ether and with an acid, metal or diazo," as stated by the Examiner. Applicants submit that the claim language is consistent and clear, and that claims particularly point out and distinctly claim the subject matter which is regarded as the invention. Accordingly, applicants respectfully request withdrawal of the rejection.

Rejection under 35 U.S.C. §103(a)

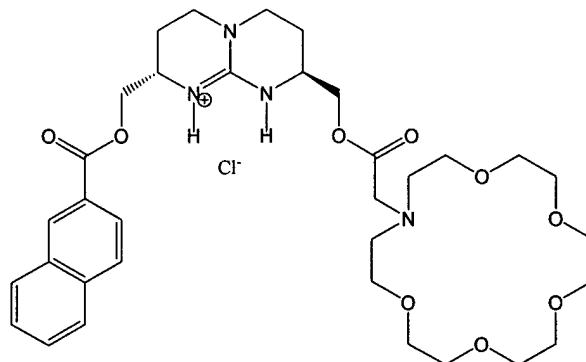
Claims 1-33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Galán et al., (1992), *J. Am. Chem. Soc.*, **114**, pp 1511-1512 (hereafter, "Galán"), in view of Dugas et al., (1991), *Chem. Abs.*, **115**, no. 471563 (hereafter, "Dugas"), Fredrick et al., (1981), *Chem. Abs.*, **94**, no. 134248 (hereafter "Fredrick"), and Ajinomoto Co., (1984), *Chem. Abs.*, **101**, no. 571295 (JP 59062583, hereafter "Ajinomoto"). Applicants traverse this rejection for at least the following reasons.

First, the Examiner states: "Galán et al. teach forming compounds from the combination of an amine-containing group, a crown ether and an acid moiety. See, for example, page 1511 scheme I." The claims of this application require, however, "reacting [an] amine-containing compound with a second compound comprising at least one crown ether group and a moiety selected from acidic groups, transition metal binding groups and diazo groups." The only compound comprising a crown ether group in Galán scheme I is compound **5**, which does not contain an acidic group, a transition metal binding group, or a diazo group. Thus, the quoted limitation is not disclosed in Galán scheme I. The closest that scheme I comes to disclosing that limitation is the fact that the amine-containing compound of Galán scheme I, compound **4**, is

synthesized by means of an acid from compound 3. However, there is a big difference between being synthesized *by means of* an acid, and *containing* an acid moiety.

Alternatively, the Examiner may be referring, not to the reactions in scheme I, but rather to the intended use of compound 1, which is to act as a receptor for amino acids. This also fails to disclose the use of an acidic group, transition metal binding group, or diazo group as claimed, because compound 1 lacks any such group.

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The Examiner appears to suggest that the deficiencies of Galán could be supplied by means of a combination with other references, to arrive at what is claimed here. However, Galán scheme I produces compound 1, with the following features: (i) non-self-complementary binding sites for carboxylate (a guanidinium function) and ammonium (a crown ether); (ii) an aromatic planar surface (the naphthalene ring); and (iii) a chiral structure. The stringent requirements of these features suggest that relatively few compounds are appropriate for the desired molecular recognition characteristics discussed in Galán. Galán itself makes no indication, explicit or implicit, that the three groups specified in the claims of the present application (i.e., acidic groups, transition metal binding groups or diazo groups) are desirable or even possible as substituent groups for compounds comprising crown ethers. Furthermore, of these three groups, only acidic groups are mentioned in any of the references (i.e., Fredrick and Dugas). However, neither Fredrick nor Dugas suggest incorporating acidic groups into compounds comprising crown ethers that satisfy the criteria specified in Galán. Thus one of ordinary skill in the art would not be motivated to combine the teachings of Galán with Dugas, Fredrick, or Ajinomoto.

Second, the claims of the current application specify a compound that comprises at least one crown ether and is capable of forming a *non-covalent complex* when reacted with an amine-containing compound. Thus, the amine-containing compound and the crown ether-containing

compound form a complex, and are *not connected via covalent bonds*. The Examiner states that Galán teaches "forming compounds from the combination of an amine-containing group, a crown ether, and an acid moiety." Indeed, compound 1 in Galán is prepared by forming a covalent linkage between an amine-containing compound and a crown ether. Neither Galán nor any of the other references suggest forming a non-covalently bonded complex between an amine-containing compound and a crown ether-containing compound.

Third, the claims of the invention are directed toward a compound that comprises a moiety that is selected from acidic groups, transition metal binding groups, and diazo groups. The Examiner states that "it is well known in the crown ether art to form crown ether containing compounds using metals. This is particularly true in view of Ajinomoto." However, Ajinomoto prepares crown ether compounds in the presence of metal compounds having molding effect (see Abstract). The example given in Ajinomoto is one in which a crown ether is formed via reaction of $C_6H_{13}NHCH_2CH(OH)CH_2OCH_2CH_2OCH_2CH(OH)CH_2NHC_6H_{13}$ with $TsOCH_2CH_2OCH_2CH_2OTs$ in the presence of sodium metal (i.e., Na). The purpose of the metal in this reaction is to hold the two reagents in a geometric orientation that allows reaction of the complementary moieties, thereby forming the cyclic structure of the crown ether. In contrast, the "transition metal binding groups" that are specified in the claims of the application are drastically different in both structure and purpose. The transition metal binding groups are *substituents* on the crown ether-containing compound, and are designed such that they can bind *transition metals* to the crown ether-containing compound. No such moieties are suggested by any of the references cited by the Examiner, nor do any of the references suggest that such moieties could be incorporated into crown ether-containing compounds. Furthermore, because of the *metal* binding (e.g., Na-binding) capability of the crown ether moiety, it would not have been obvious to one of skill in the art to synthesize a compound comprising both a crown ether and a separate, *transition metal* binding moiety. However, the examples disclosed in the application clearly show the advantage of doing so.

Fourth, as with transition metal binding groups, diazo groups are also neither disclosed *nor suggested* by any of the references cited by the Examiner. One of ordinary skill in the art would not find it obvious to incorporate a highly-reactive diazo group into the crown ethers reported in the references.

Fifth, with regard to claims 1-18, there is no mention (or implied suggestion) in any of the references cited by the Examiner of using crown ether-containing compounds for *forming non-covalent complexes and initiating intermolecular reactions*, as required by the currently pending claims.

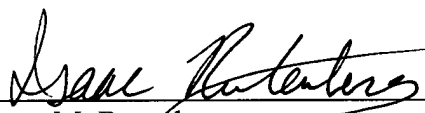
For at least the foregoing reasons, applicants submit that the combination of Galán, Ajinomoto, Fredrick and Dugas does not render the currently pending claims obvious, and accordingly request withdrawal of the rejection.

CONCLUSION

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

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